DCM Series

- Open Frame Telecom DC-DC Converter
- -48 VDC Input
- ETSI Compliant
- NEBS Compliant
- Convection-cooled
- High Power Density in 2 Small Package Sizes
- Covered Versions Available

The DCM family complements the ECM series, offering a feature-rich power converter for DC-input applications. The ECM family has been widely adopted in 1U networking systems, to include switching, routing, system monitoring, and video production racks. Designers will now have the ability to integrate a power solution, adopted for normal mains operation or -48V telecoms input requirements. The input to the DCM series meets the stringent input regulations for connecting to telecoms networks as seen in ETS 300 132-2. Features include abnormal voltage operation, reverse polarity, transient protection,surge limiting EMC limits to ETSI and NEBs standards.

Models and Ratings

Output Voltage	Output Current			Model Number
	Min	Max - Convection-cooling	Max - 5CFM forced-cooling	
12 V	0.25 A	5.00 A	5.00 A	DCM6048S12
12 V	0.40 A	7.50 A	8.30 A	DCM10048S12

Note: For fitted cover, add suffix “C” to model number (output power derates by 20% with cover fitted).

Input Characteristics

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage - Operating	36	48	75	VDC	Can be configured as -48 VDC. See Fig. 11
Input Current - Min Load		0.4	0.6	A	DCM60
		0.1	0.2		DCM100
Input Current - Full Load		1.5	2.5	A	DCM60
		2.2	3.5		DCM100
Input Reverse Voltage Protection					Continuous protection with automatic recovery
Input Transient					ETSI EN300 132:2003 Compliant
Undervoltage Lockout Protection	32		35	VDC	
Inrush Current		15	40	A	DCM60 (48 VDC input) [1]
		20	40		DCM100 (48 VDC input) [1]
Input Protection		3.15		A	DCM60 [2]
		5.00			DCM100 [2]

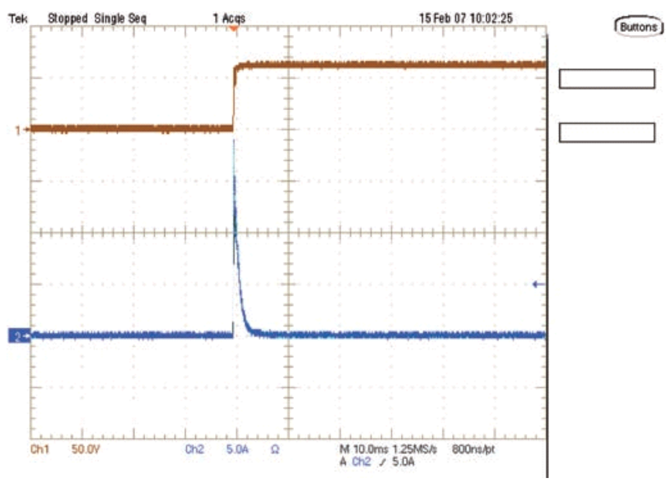
Note: 1. ETSI EN 300 132:2003 Compliant

2. Fuse fitted in +ve input line. See Fig. 10 & 11.

Figure 1
Typical inrush current characteristics

Input Voltage

Input Current

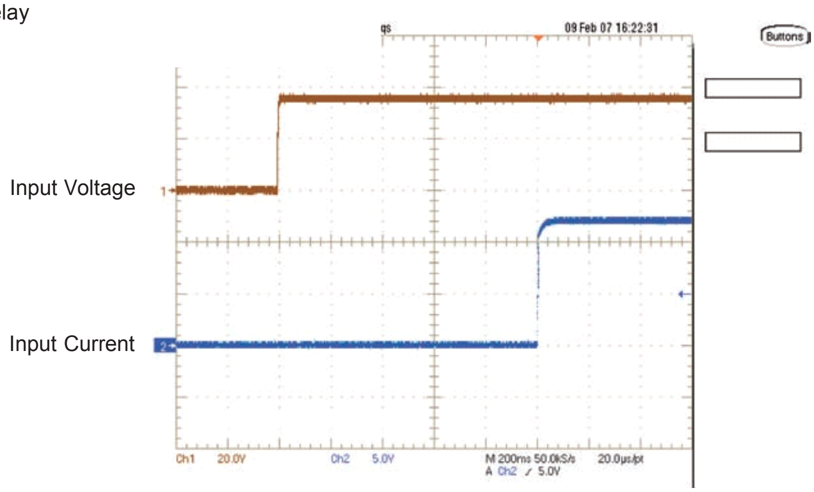


Output Characteristics

Characteristic					
Output Voltage - V1	12		12	VDC	See Models and Ratings table
Initial Set Accuracy			±1	%	48 VDC input at 50% load
Output Voltage Adjustment	±10			%	Via potentiometer
Minimum Load	5			%	Required to meet all specification parameters
Start Up Delay		1	1.5	s	See Fig. 2
Hold-Up Time		4		ms	
Drift			±0.2	%/ºC	
Line Regulation			±0.5	%	Of nominal with input variation 36-75 VDC
Load Regulation			±1	%	5-100% load of nominal input
Transient Response - V1			4	%	Recovery within 1% in less than 500 µs for a 50-75-50% load step
Over/Undershoot - V1			1	%	
Ripple & Noise			1	% pk-pk	20 MHz bandwidth 0.1 µF capacitor connected across measuring points. See Fig. 3
Overvoltage Protection	115		135	%	Vnom DC, recycle input to reset
Overload Protection	105		150	% I nom	See Fig. 4
Short Circuit Protection					Continuous, trip & restart (hiccup) characteristic
Temperature Coefficient			0.02	%/˚C	After 20 mins warm up

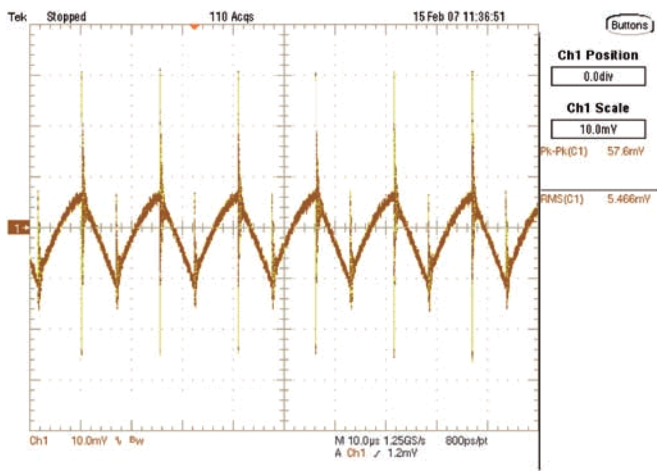
Start Up Delay From DC Turn On

Figure 2: Typical start up delay



Ripple & Noise

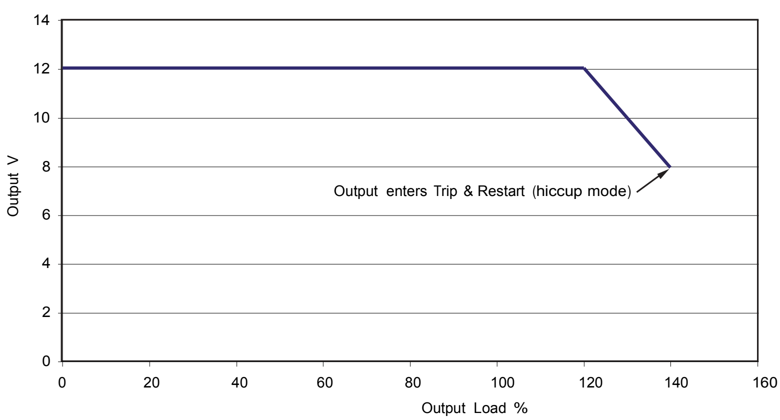
Figure 3: Typical ripple & noise



Overcurrent Protection

Figure 4

Typical Over Current Profile



General Specifications

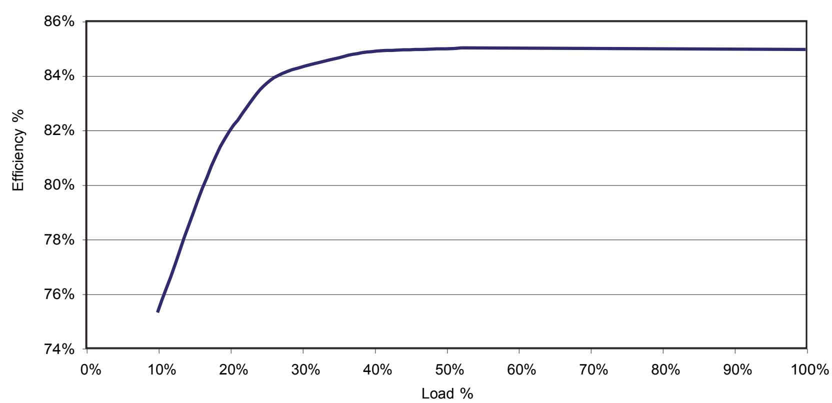
Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency		85		%	Full load. See Fig. 5
Isolation: Input to Output	1500			VDC	Basic insulation
Input to Ground	1000			VDC	
Output to Ground	500			VDC	
Switching Frequency		70		kHz	
Power Density			6.3	W/in³	DCM60
			7.4		DCM100
Mean Time Between Failure:		740		kHrs	DCM60. See note 1
		540			DCM100. See note 1
Weight		0.33 (150)		lb (g)	DCM60
		0.44 (200)			DCM100

Notes

1. Compliant with MIL-HDBK-217F, Notice 2 +25 °C GB

Efficiency Vs Load Characteristics

Figure 5: Typical efficiency 48 V input



Environmental

Characteristic	Minimum	Typical	Maximum	Units	
Operating Temperature					
- Convection-cooled	0		+50	ºC	Derate linearly to 50% at 70 ºC
- Force-air cooled	0		+60	ºC	Derate linearly to 75% at 70 ºC
Storage Temperature	-40		+80	ºC	
Cooling - Convection-cooled					See Thermal Considerations
- Force-air cooled	5			CFM	See Thermal Considerations
Operating Humidity	0		95	%RH	Non-condensing. See page 5. note 1 & 3
Storage Humidity	0		95	%RH	Non-condensing. See page 5. note 2 & 3
Operating Altitude			3000	m	See page 5. note 3
Shock	3 x 30 g/11 ms shocks in both +ve & -ve directions along the 3 orthogonal axis, total 18 shocks. See page 5. note 1 & 4				
Vibration	Single axis 10-500 Hz at 2 g x 10 sweeps. See page 5. note 1 & 5				

Safety Agency Approvals

Safety Agency	Safety Standard	
CB Report	CSA #155548 - 1937080, IEC60950-1:2001	Information Technology
CSA	CSA Certificate #1937079 CSA22.2 No. 60950-1-03	Information Technology
UL	UL File # E139109 UL60950-1 (2003)	Information Technology
TUV	TUV Certificate # B 07 09 57396 037 EN60950-1/A11:2004	Information Technology
CE	LVD	

Electromagnetic Compatibility - Immunity

Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
EFT	EN61000-4-4	1	A	
Surges	EN61000-4-5	1	A	
Conducted	EN61000-4-6	2	A	
Narrow & Wide Band Noise	ETSI EN 300 132-2:2003			

Electromagnetic Compatibility - Emissions

Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
Conducted	EN55022	Class A		DCM60 (6). See Fig. 6
		Class B		DCM60 (-48 VDC input) (6). See Fig. 7 & 11.
	EN55022	Class A		DCM100 (6). See Fig. 8
		Class B		DCM100 (-48 VDC input) (6) . See Fig. 9 & 11.
Radiated	EN55022	Class A		(6)

Notes

1. Compliant with ETS 300 019-1-3 May 1992 + ammendment 1 June 1997 class 3.1.
2. Compliant with ETS 300 019-1-1 Feb 1992 class 1.1, ETS 300 019-1-2 Feb 1992 class 2.2.
3. Compliant with NEBS GR-63-Core issue 3.
4. Compliant with EN60068-2-27.
5. Compliant with EN60068-2-6.
6. Compliant with EN61204-3, ETSI EN 300 132-2 2003, ETSI 300 386-1 1994, NEBS GR-1089-CORE issue 4

Typical EMC Plot

Figure 6: DCM60US12 at full load with 48 VDC input

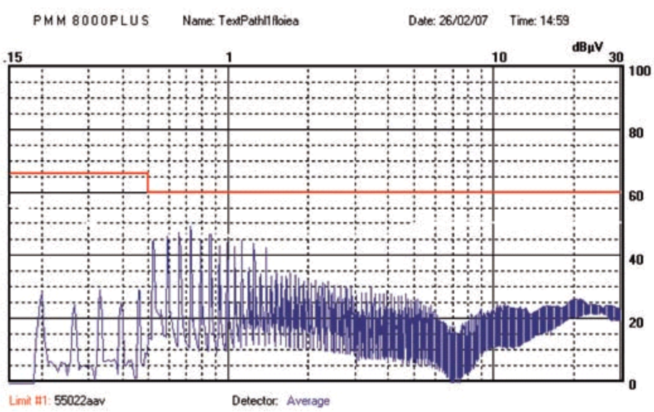


Figure 7: DCM60US12 at full load with -48 VDC input

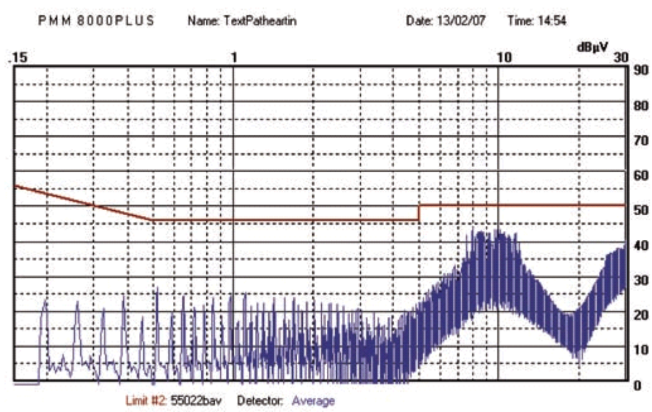


Figure 8: DCM100 at full load with 48 VDC input

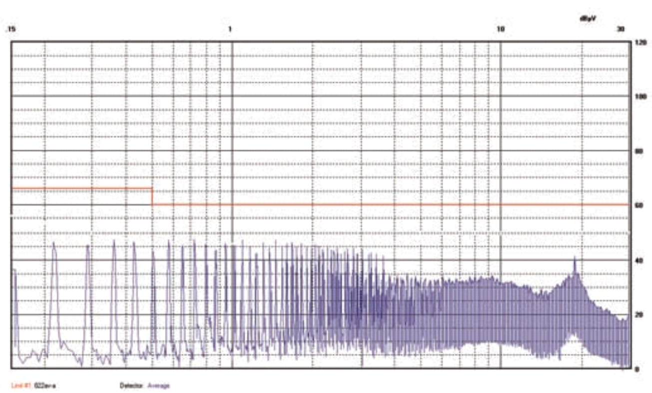
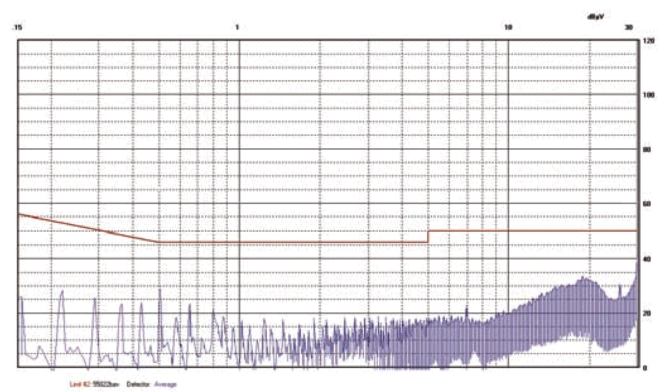
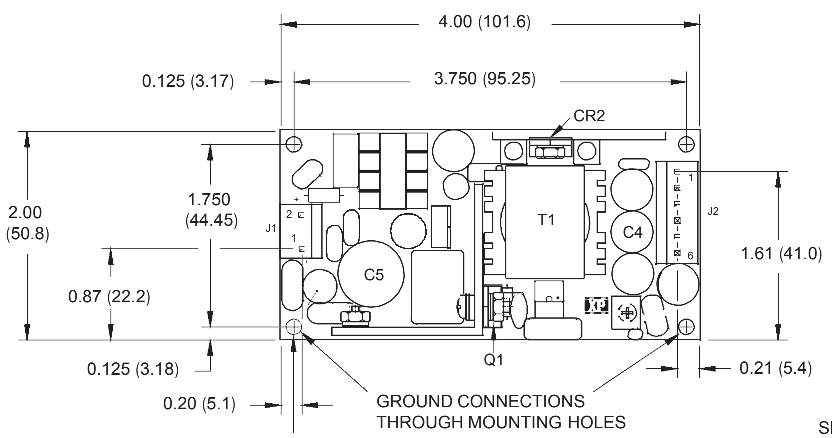


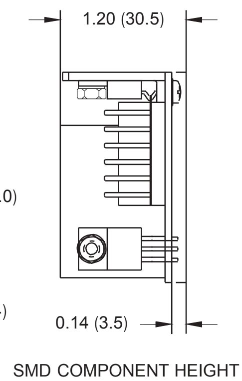
Figure 9: DCM100 at full load with -48 VDC input



Mechanical Details

DCM60





4X ø 0.156 (3.96) MOUNTING HOLES
ø0.312 (7.92) CLEARANCE TOP AND BOTTOM

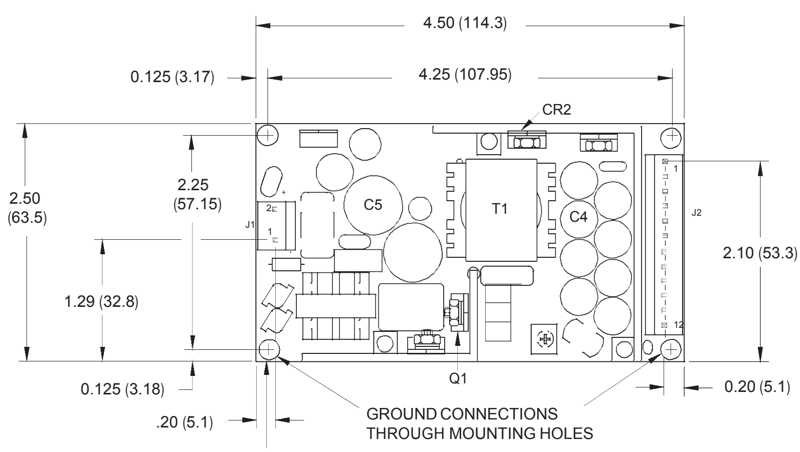
Input Connector J1	
Pin 1	-Vin
Pin 2	+Vin

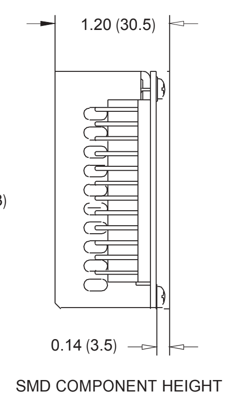
J1 mates with
Molex housing 43061-0003 &
Molex series 5194 crimp terminals

Output Connector J2	
Pin	Single
1	+12V
2	+12V
3	RTN
4	RTN
5	NC
6	NC

J2 mates with
Molex housing 43061-0006 &
Molex series 5194 crimp terminals

DCM100





4X ø 0.156 (3.96) MOUNTING HOLES
ø0.312 (7.92) CLEARANCE TOP AND BOTTOM

Pin 1	-Vin
Pin 2	+Vin

J1 mates with
Molex housing 43061-0003 &
Molex series 5194 crimp terminals

1	+12V
2	+12V
3	+12V
4	+12V
5	RTN
6	RTN
7	RTN
8	RTN
9	NC
10	NC
11	NC
12	NC

J2 mates with
Molex housing 43061-0012 &
Molex series 5194 crimp terminals

Notes

1. All dimensions in inches (mm). Tolerance .xx = ±0.02 (0.50); .xxx = ±0.01 (0.25)
2. Cover kits available separately, order part number no. ECM40/60 COVER (4.49 x 2.52 x 1.52 (114 x 64 x 38.5)) for DCM60 or part no. ECM100 COVER (4.96 x 3.05 x 1.52 (126 x 77.5 x 38.5)) for DCM100. Output power derates by 20% with cover fitted.

Thermal Considerations

In order to ensure correct and reliable operation of the PSU in the most adverse conditions permitted in the end-use equipment, the temperature of the components listed in the table below must not be exceeded. See drawing on page 6 for component locations. Temperature should be monitored using K type thermocouples placed on the hottest part of the component (out of any direct air flow).

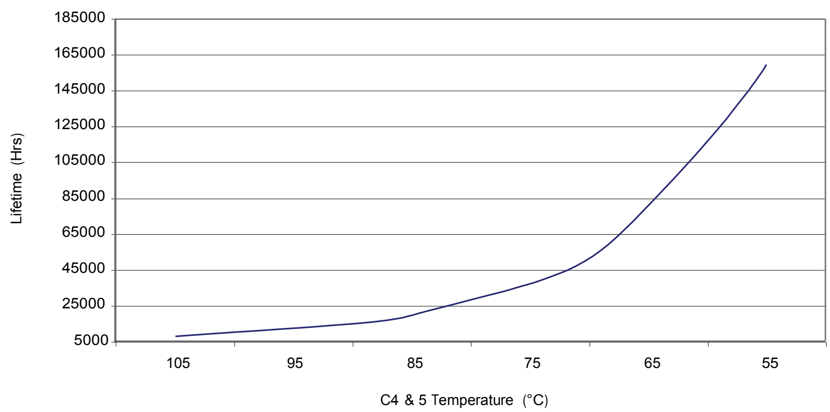
Temperature Measurements (Ambient ≤ 50 ºC)		
Component	DCM60 - Max Temperature ºC	DCM100 - Max Temperature ºC
T1	100 ºC	110 ºC
Q1	105 ºC	110 ºC
C4	80 ºC	85 ºC
C5	85 ºC	85 ºC
CR2	110 ºC	110 ºC

Service Life

The estimated service life of the DCM is determined by the cooling arrangements and load conditions experienced in the end application. Due to the uncertain nature of the end application this estimated service life is based on the actual measured temperature of two key capacitors within the product when installed in the end application. The highest of the two component temperatures should be used.

Estimated Service Life vs Component Temperature

The graph below expresses the estimated lifetime for a given component temperature and assumes continuous operation at this temperature.



Input Configuration

The DCM input is floating and can be configured for use with either +48 VDC or -48VDC for telecom applications

Figure 10: +48 VDC Configuration

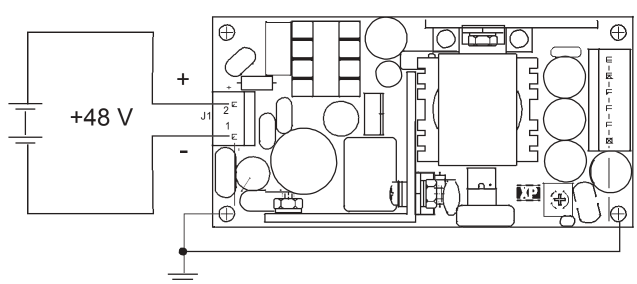
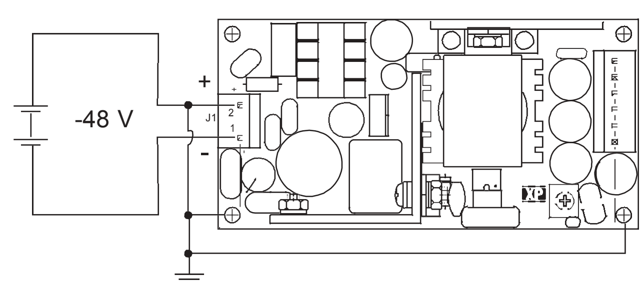


Figure 11: -48 VDC Configuration



North American HQ

XP Power
990 Benecia Avenue, Sunnyvale, CA 94085
Phone : +1 (408) 732-7777
Fax : +1 (408) 732-2002
Email : nasales@xppower.com

North American Sales Offices

Toll Free	+1 (800) 253-0490
Central Region	+1 (972) 578-1530
Eastern Region	+1 (973) 658-8001
Western Region	+1 (408) 732-7777

European HQ

XP Power
Horseshoe Park, Pangbourne,
Berkshire, RG8 7JW, UK
Phone : +44 (0)118 984 5515
Fax : +44 (0)118 984 3423
Email : eusales@xppower.com

German HQ

XP Power
Auf der Höhe 2, D-28357
Bremen, Germany
Phone : +49 (0)421 63 93 3 0
Fax : +49 (0)421 63 93 3 10
Email : desales@xppower.com

European Sales Offices

Austria	+41 (0)56 448 90 80
Belgium	+33 (0)1 45 12 31 15
Denmark	+45 43 42 38 33
Finland	+46 (0)8 555 367 01
France	+33 (0)1 45 12 31 15
Germany	+49 (0)421 63 93 3 0
Italy	+39 039 2876027
Netherlands	+49 (0)421 63 93 3 0
Norway	+47 63 94 60 18
Sweden	+46 (0)8 555 367 00
Switzerland	+41 (0)56 448 90 80
United Kingdom	+44 (0)118 984 5515

Global Catalog Distributors

Americas	Newark	newark.com
Europe & Asia	Farnell	farnell.com
China	Premier Electronics	premierelectronics.com.cn

Asian HQ

XP Power
401 Commonwealth Drive, Haw Par Technocentre, Singapore 149598
Phone : +65 6411 6900
Fax : +65 6741 8730
Email : apsales@xppower.com
Web : www.xppowerchina.com / www.xppower.com

Asian Sales Offices

Shanghai	+86 21 51388389
Singapore	+65 6411 6902

Distributors

Australia	+61 2 9809 5022	Amtex
Balkans	+386 1 583 7930	Elbacomp
Czech Rep.	+420 235 366 129	Vums Powerprag
Czech Rep.	+420 539 050 630	Koala Elektronik
Estonia	+372 6228866	Elgerta
Greece	+30 210 240 1961	ADEM Electronics
Israel	+972 9 7498777	Appletec
Japan	+81 48 864 7733	Bellnix
Korea	+82 31 422 8882	Hanpower
Latvia	+371 67501005	Caro
Lithuania	+370 5 2652683	Elgerta
Poland	+48 22 8627500	Gamma
Portugal	+34 93 263 33 54	Venco
Russia	+7 (495)234 0636	Prosoft
Russia	+7 (812)325 5115	Gamma
South Africa	+27 11 453 1910	Vepac
Spain	+34 93 263 33 54	Venco
Taiwan	+886 3 3559642	Fullerton Power
Turkey	+90 212 465 7199	EMPA